Advanced Structural Design Final Assignment 課題

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Try to use MATLAB to calculate the structural problem of the passive control. You can select one of the two problems and discuss the efficiency of the passive control system by a parametrical study, for a viewpoint of structural design under dynamic forces.
（以下の 2 問を計算結果をレポートの形でまとめよ．パラメトリックな計算結果に基づき，動的外力を受ける構造物の設計という立場から考察し，まとめること．）

（Those who do not have MATLAB nearby can borrow a CD with MATLAB.from Fujino. Please come to pick it up. You have to return it when finished. If you do not return it, you will not get a grade MATLABがそばにない人は，藤野のところでCDを借りてください．あとで返すこと．返さないと成績はつきません．）

Length few pages to several pages including figures
枚数は数枚程度にまとめよ

Ground motions are provided in bridge lab. homepage
地震動は橋梁研のHPから

Problem 1

Base-isolation, using laminated rubber bearings for example, is a very effective way to protect structures against strong earthquakes Consider one-floor building (shown as Figure 1) excited by the ground motion in the earthquake as shown, and use a 2DOF model for the calculation. Describe the effectiveness of the base-isolation of structures (shown as Figure 1). The damping coefficient c can be varied.

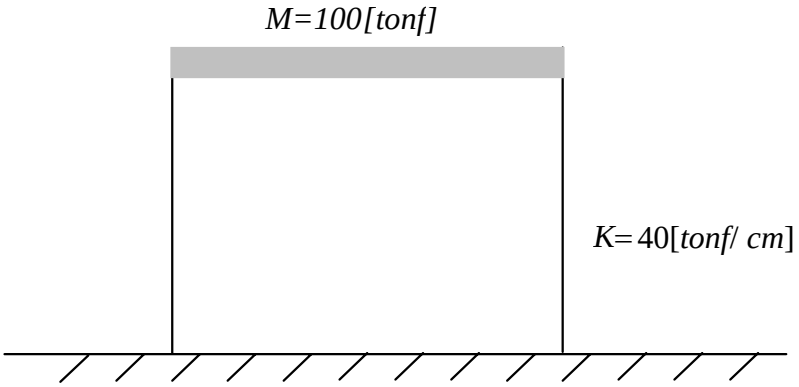


Figure 1. Original structure

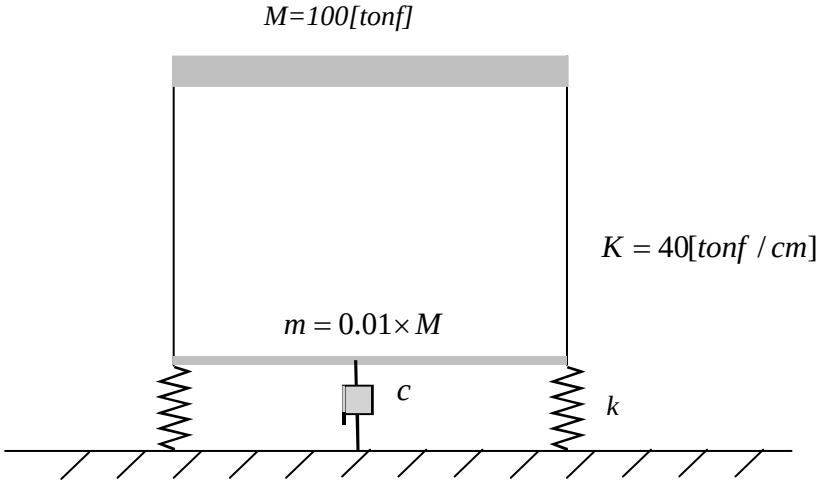


Figure 2. Base-isolated structure

This 2DOF model can be shown as Figure 3. And use the model shown as Figure 4 to develop the numerical model.

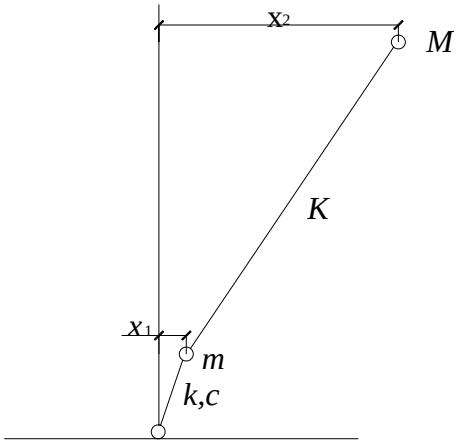


Figure 3. 2DOF model

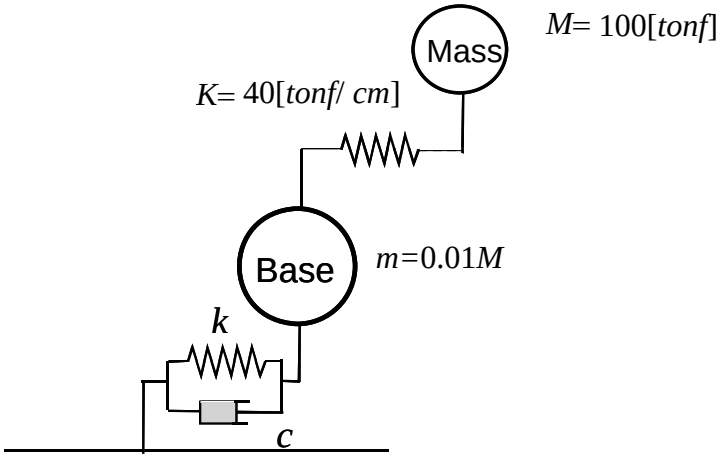


Figure 4. Numerical model

Problem2

Consider a seismic response of a SDOF with perfect elasto-plastic hysteresis property. Discuss a accuracy of the rule

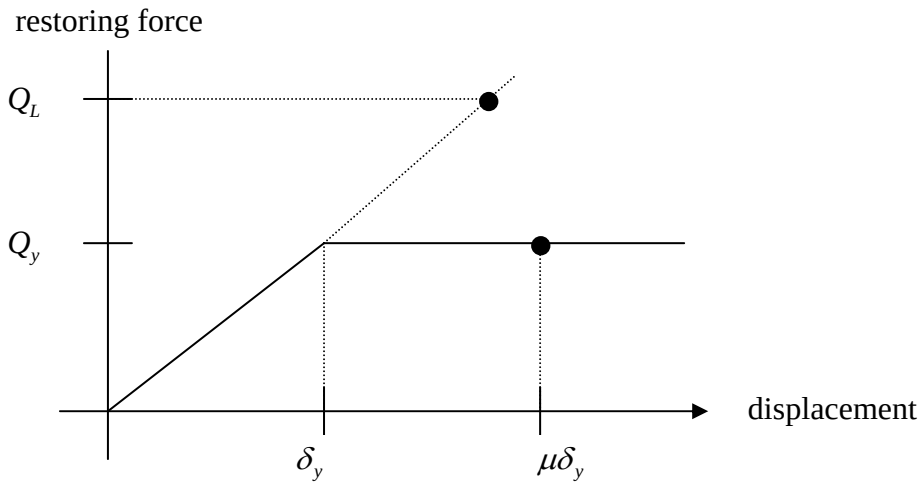
$$\frac{Q_y}{Q_L} = \frac{1}{\sqrt{2\mu - 1}} \quad (\mu\text{:ductility})$$

Under various combination of yield level and ground motion. Assume damping ratio ξ=0.02(2%)

完全弾塑 1 自由度系の地震応答を考える.

$$\frac{Q_y}{Q_L} = \frac{1}{\sqrt{2\mu - 1}}$$ （μ ：じん性）

のルールがどのくらい成り立つかをﾊﾟラメトリックな計算から調べよ．誤差について議論すること．



1.
2. 橋梁の耐震設計と耐震補強 / M. J. N. Priestley, F. Seible, G. M. Calvi 著 ; 川島一彦監訳, 東京 : 技報堂出版 1998.4
3. 構造物の免震・防振・制振 / 武田寿一編 ,東京 : 技報堂出版, 1988.5.
4. 免震設計入門 / R. I. ｽｷﾅｰ, W. H. ﾛﾋﾞﾝｿﾝ, G. H. ﾏｯｸﾍﾞﾘｰ共著, 東京 : 鹿島出版会 1996.11

Deadline of the assignment is the Aug. 20(Mon), 2007.
Submit it by email (Fujino office No.1 Eng Bldg 2F, Bridge & Structure Lab)
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